



**Sierra Valley  
Groundwater  
Management District**

# Board of Directors Meeting

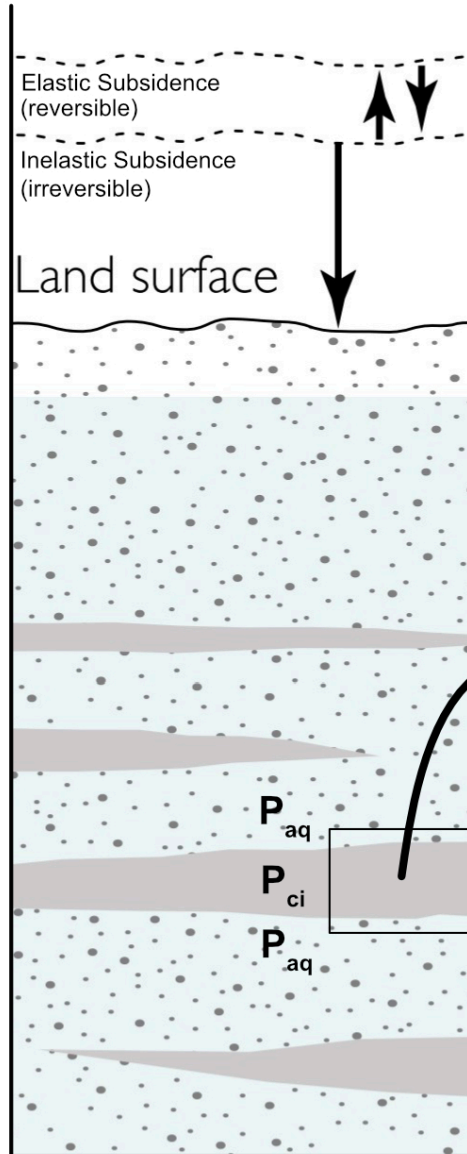
August 19, 2024



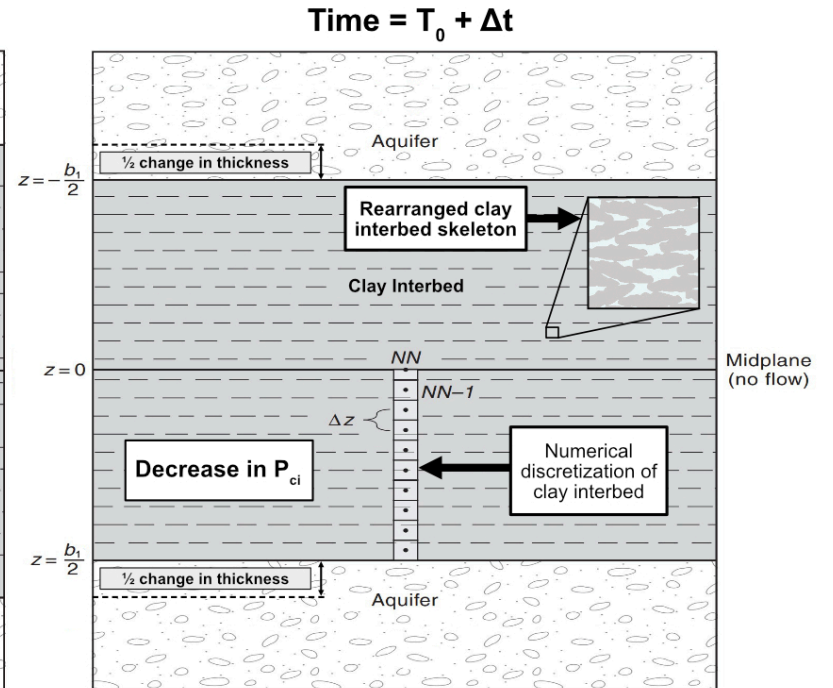
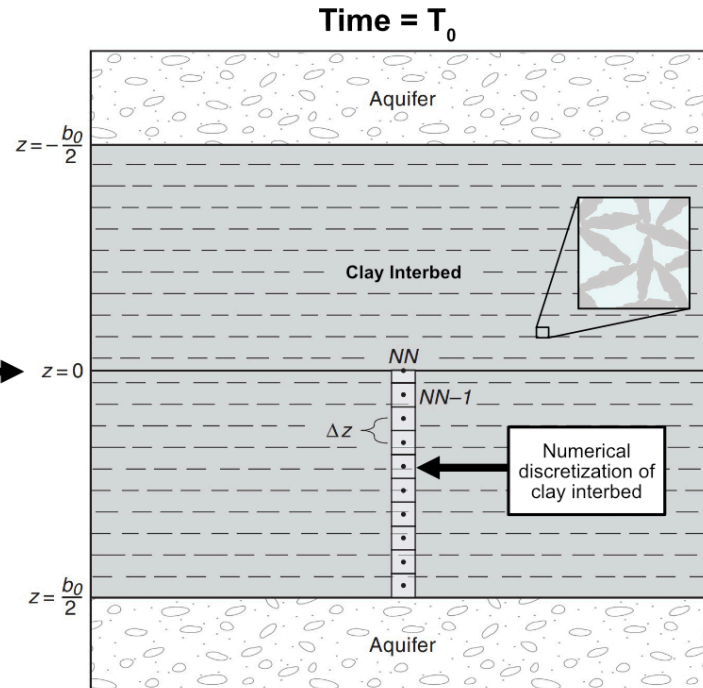
**LARRY WALKER  
ASSOCIATES**  
science | policy | solutions



# A brief review of subsidence



when  $P_{aq} < P_{ci}$



Bedekar and others, 2024

# Subsidence can be measured by satellites using **Interferometric Synthetic Aperture Rader (InSAR)**



Paid for by DWR

Monthly measurement interval gives us:

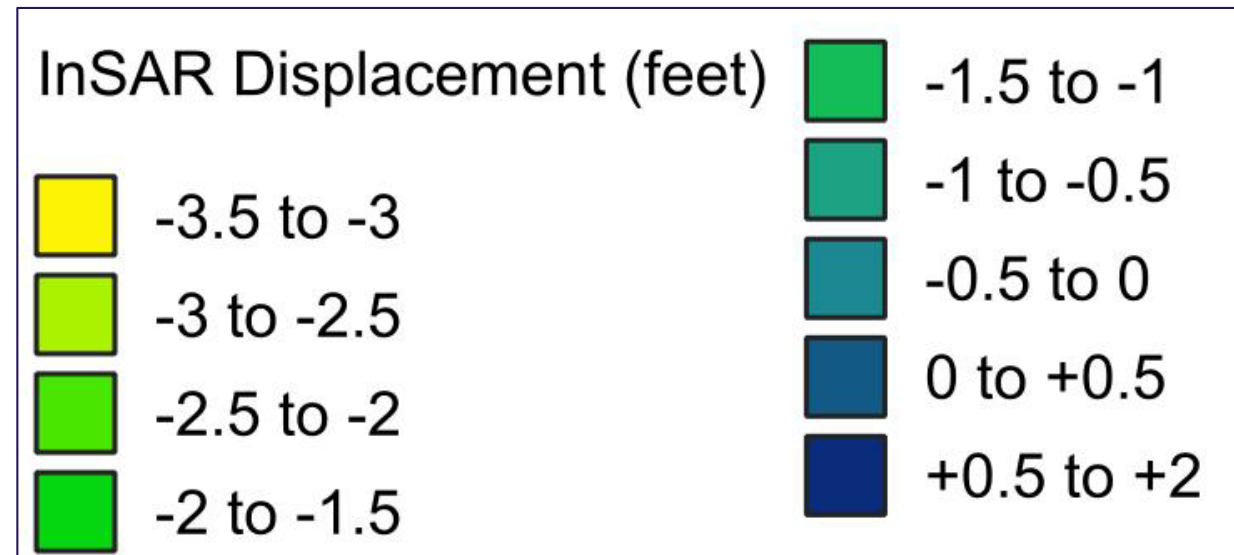
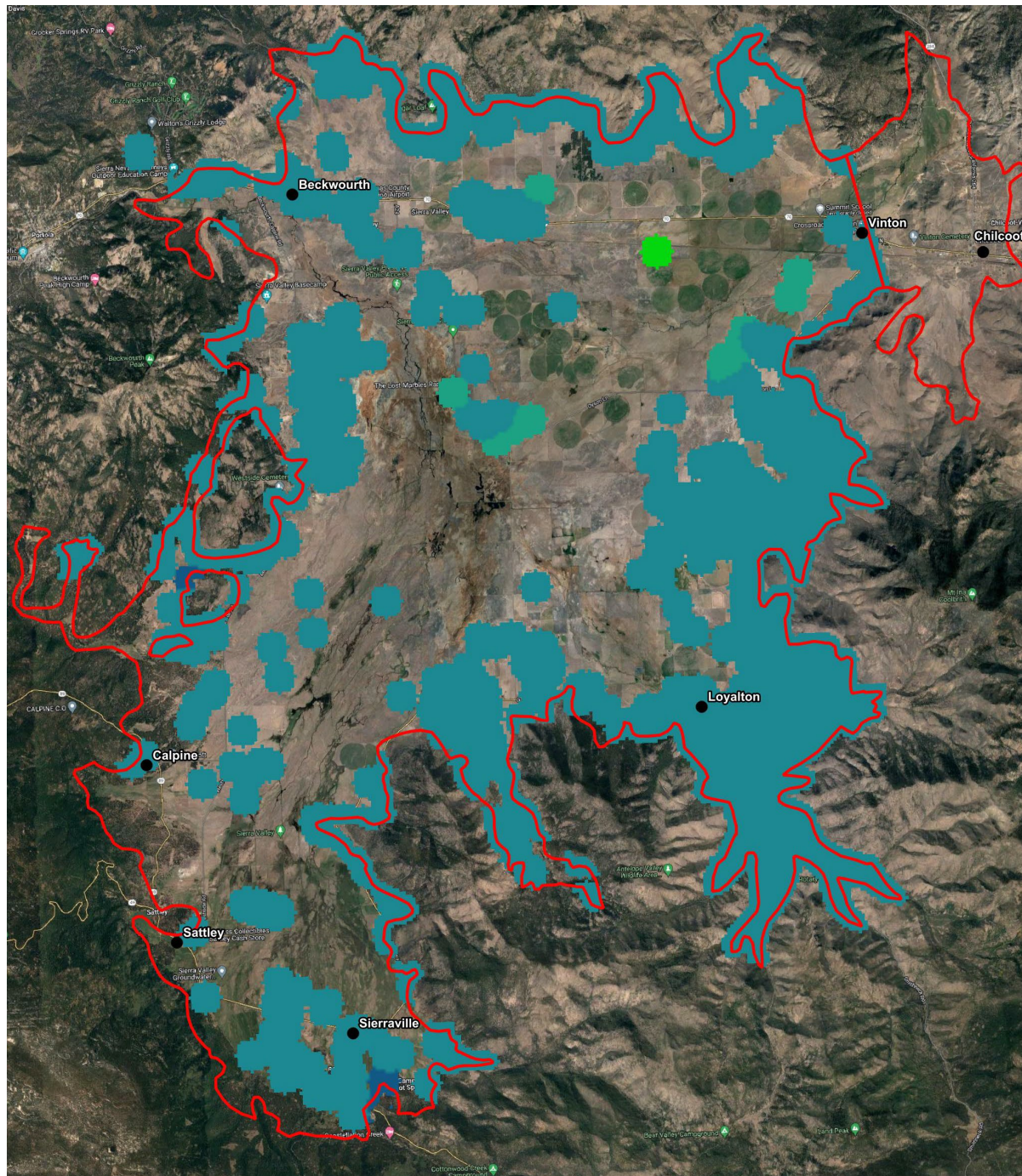
- Total displacement since June 2015
- Annual displacement rates

Can look at:

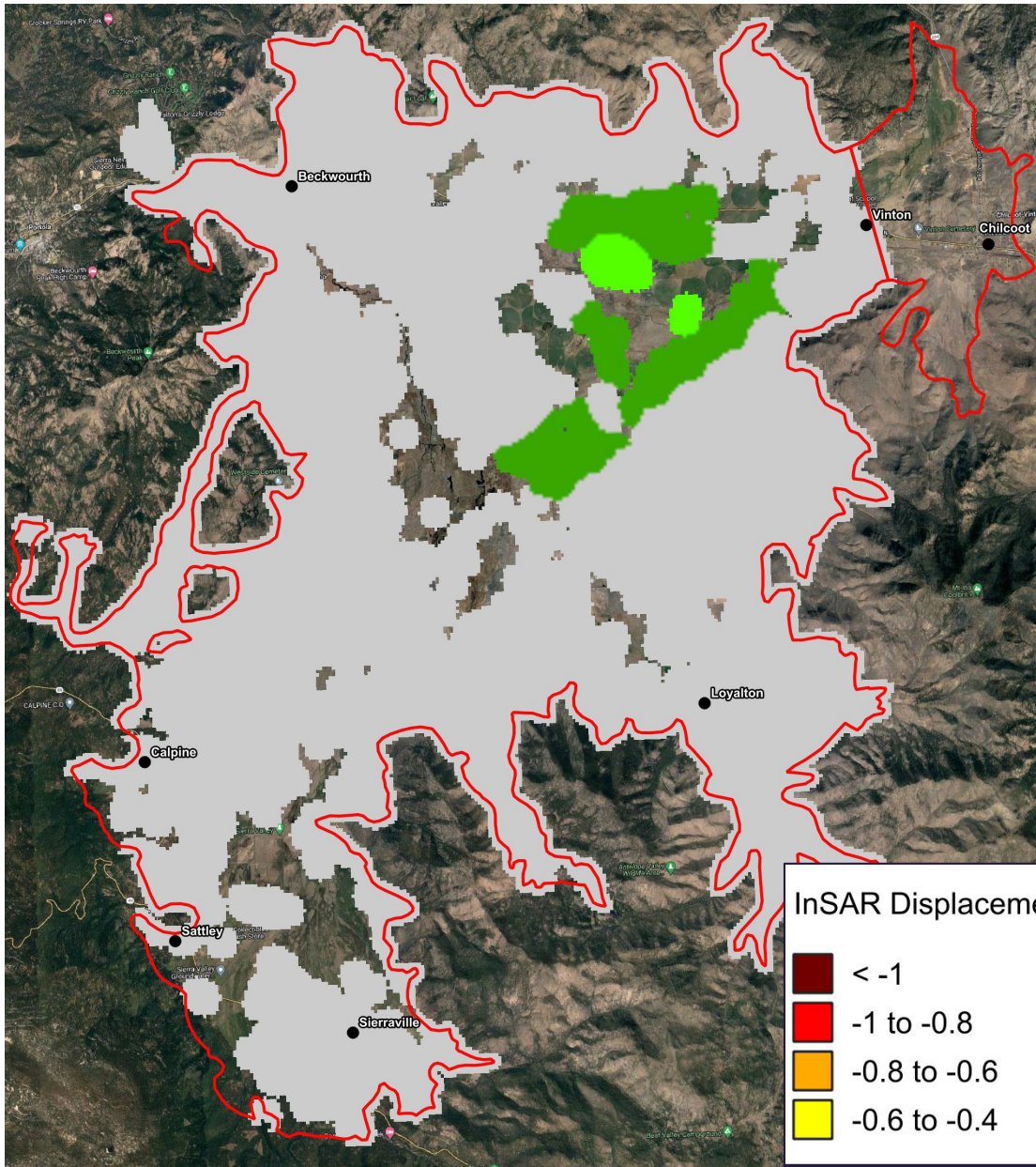
1. Large area at a single snapshot in time (map)
2. Single point over a long period of time (graph)

# Map of Total Subsidence (June 2015 - April 2024)

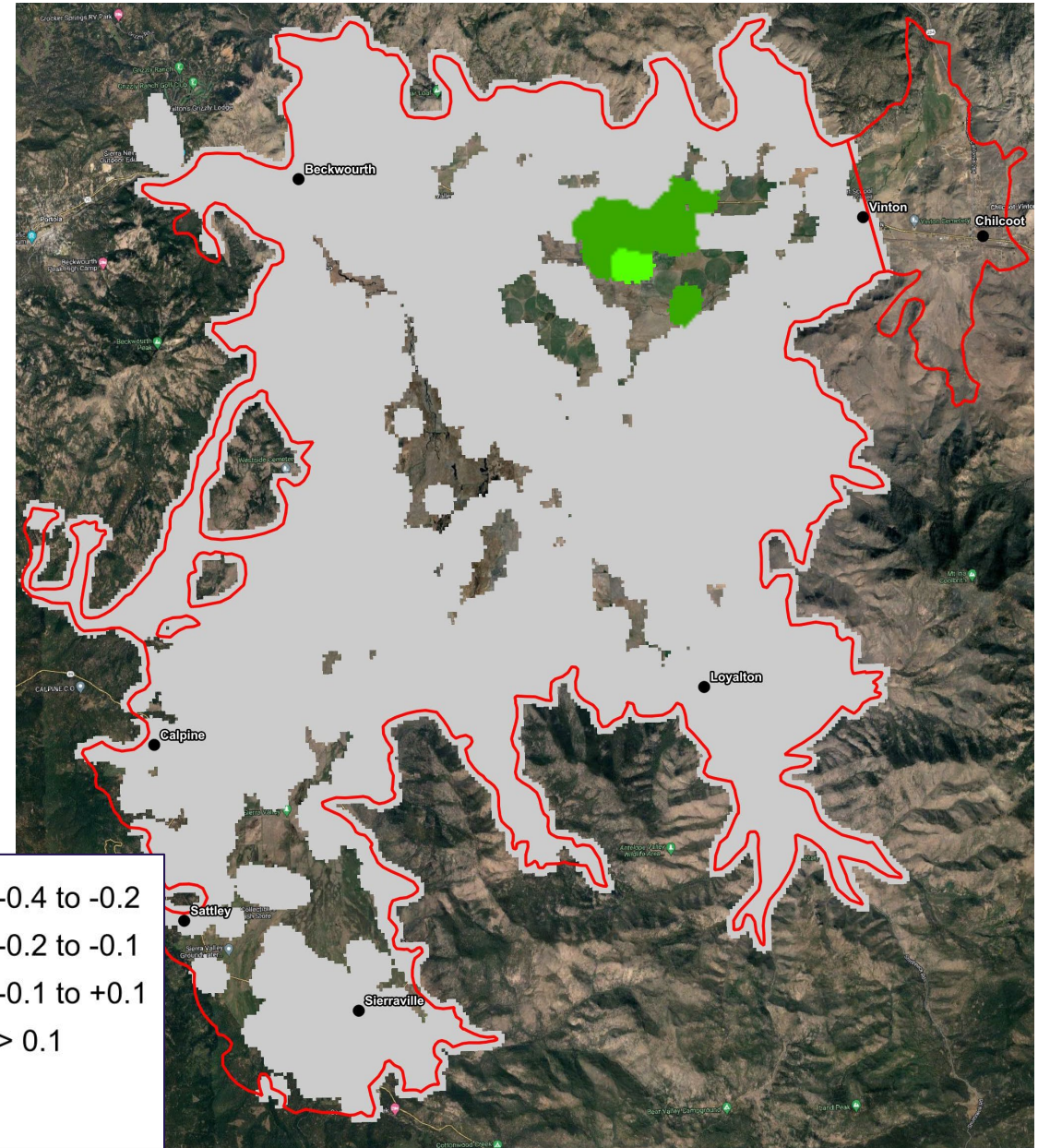
Lots of data gaps...



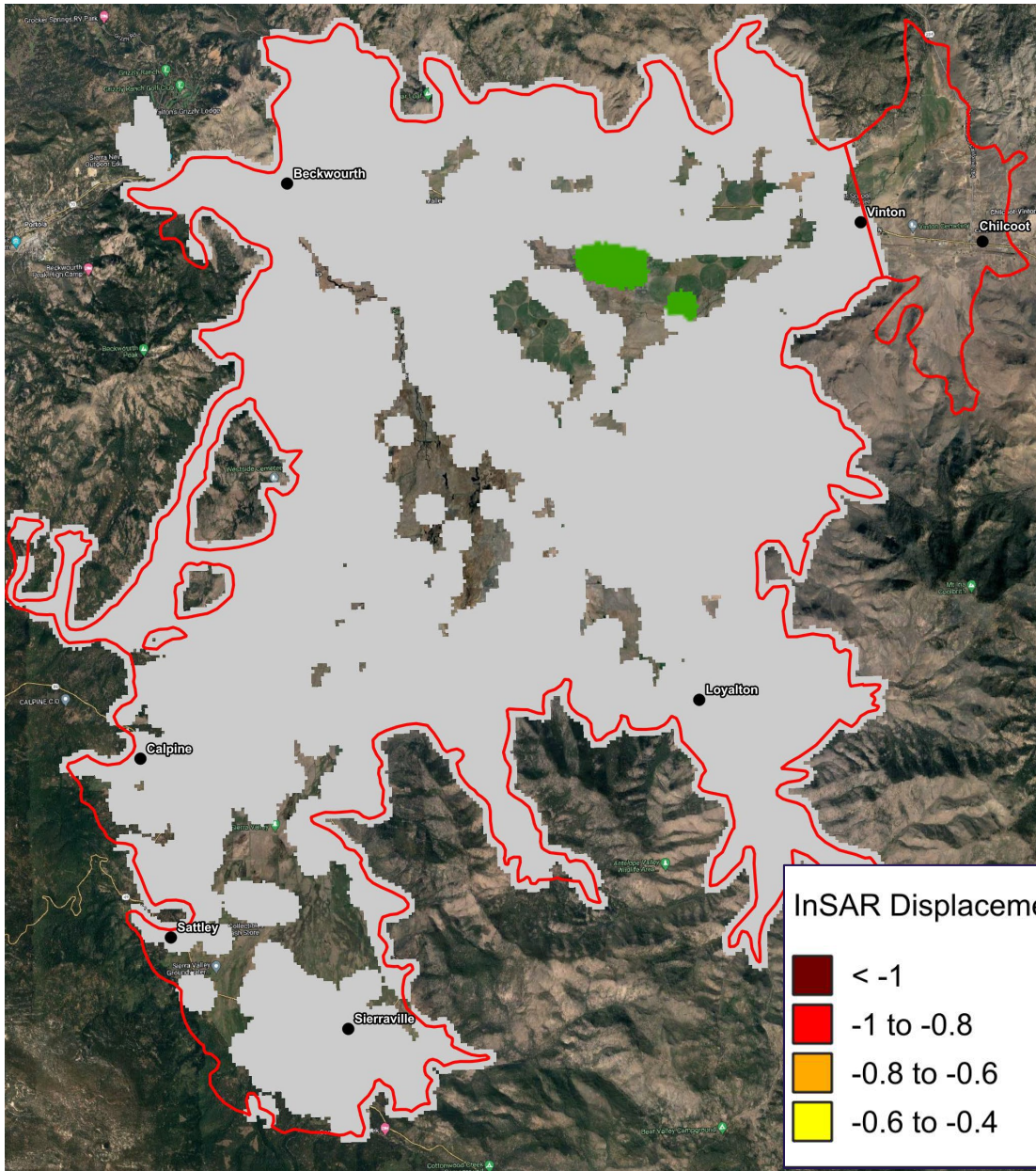
October: 2015 - 2016



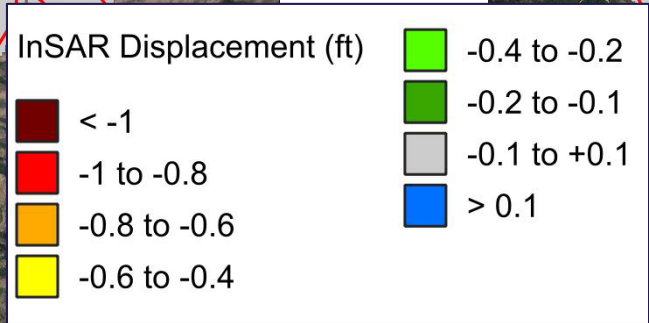
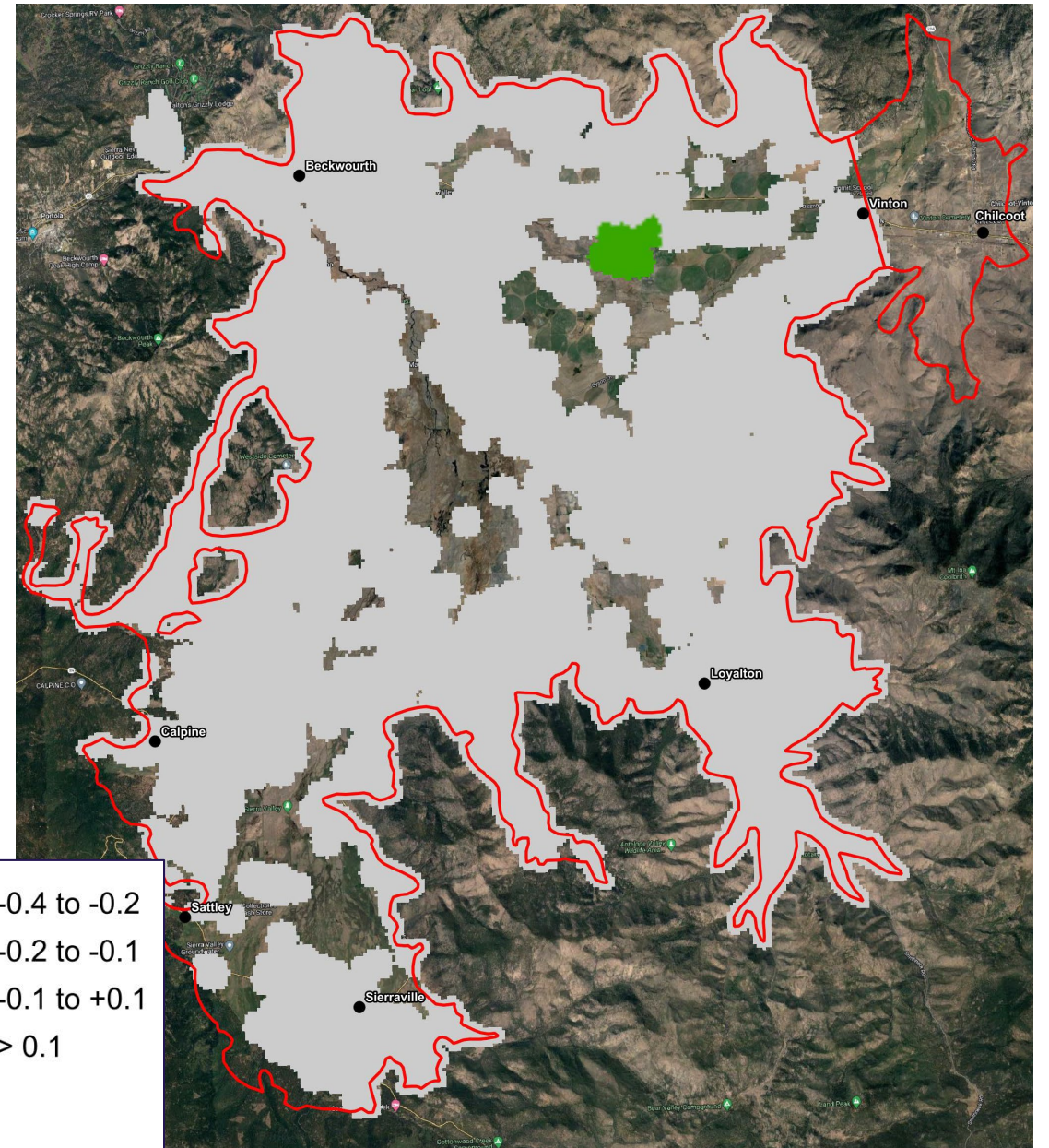
October: 2016 - 2017



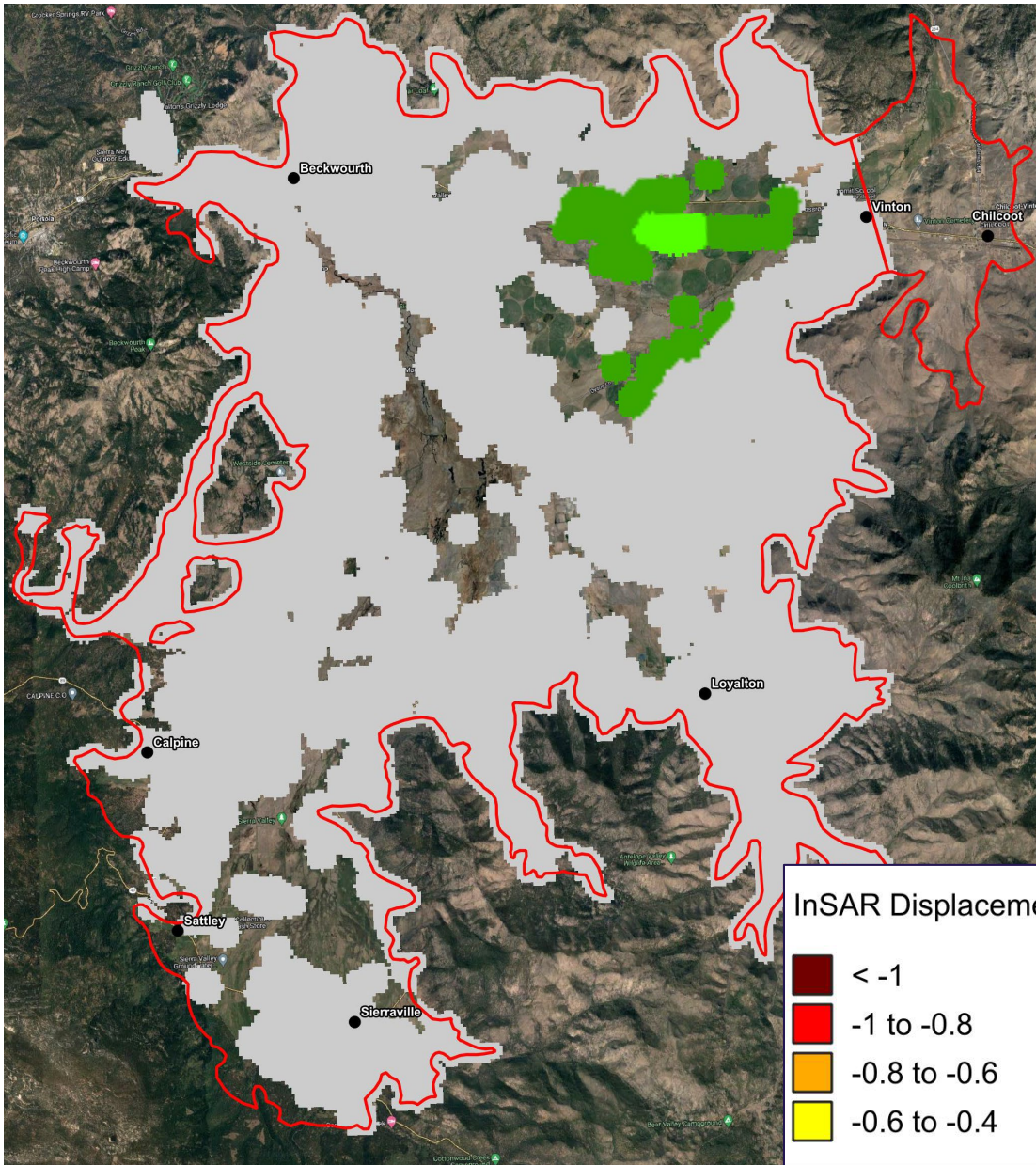
# October: 2017 - 2018



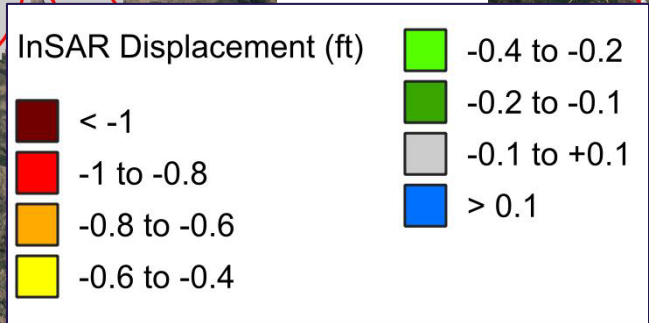
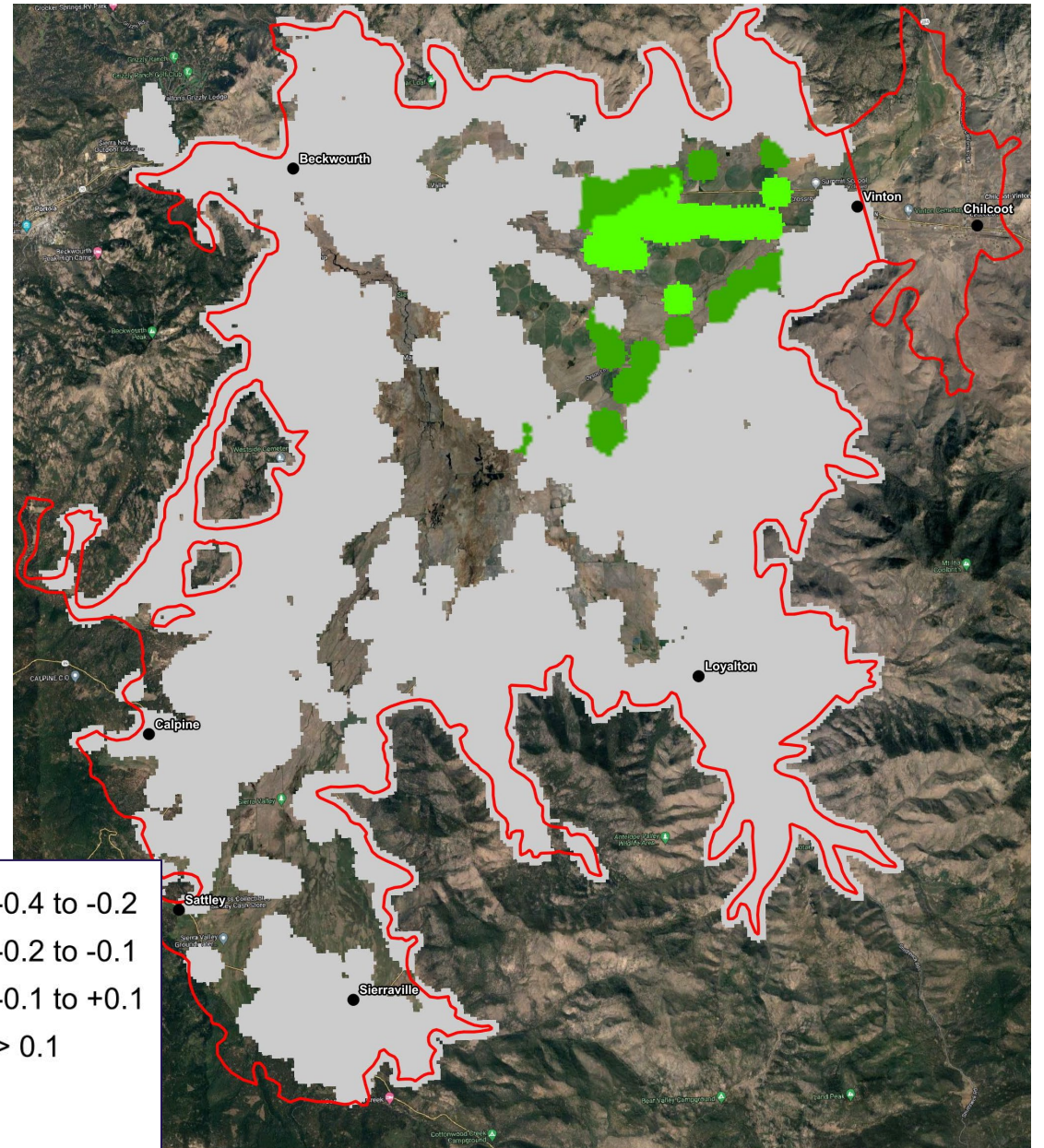
# October: 2018 - 2019



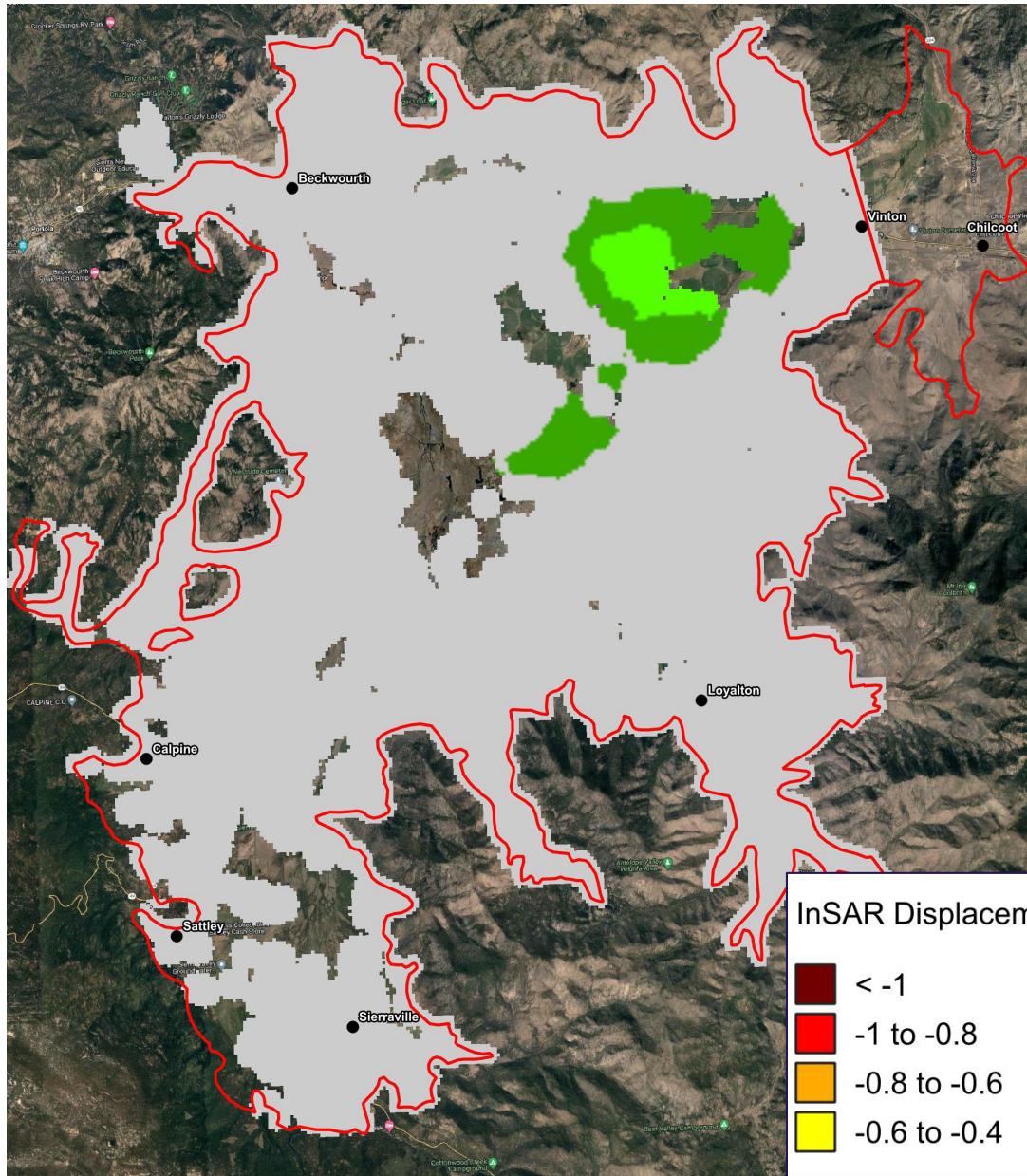
October: 2019 - 2020



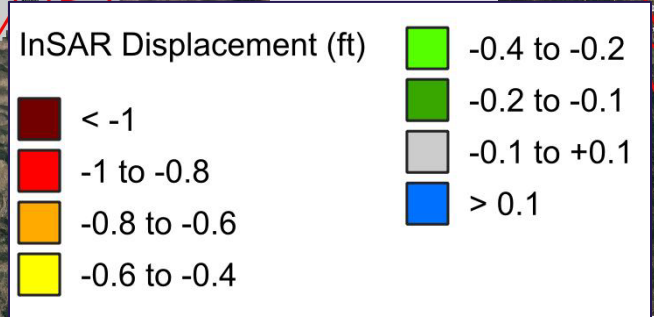
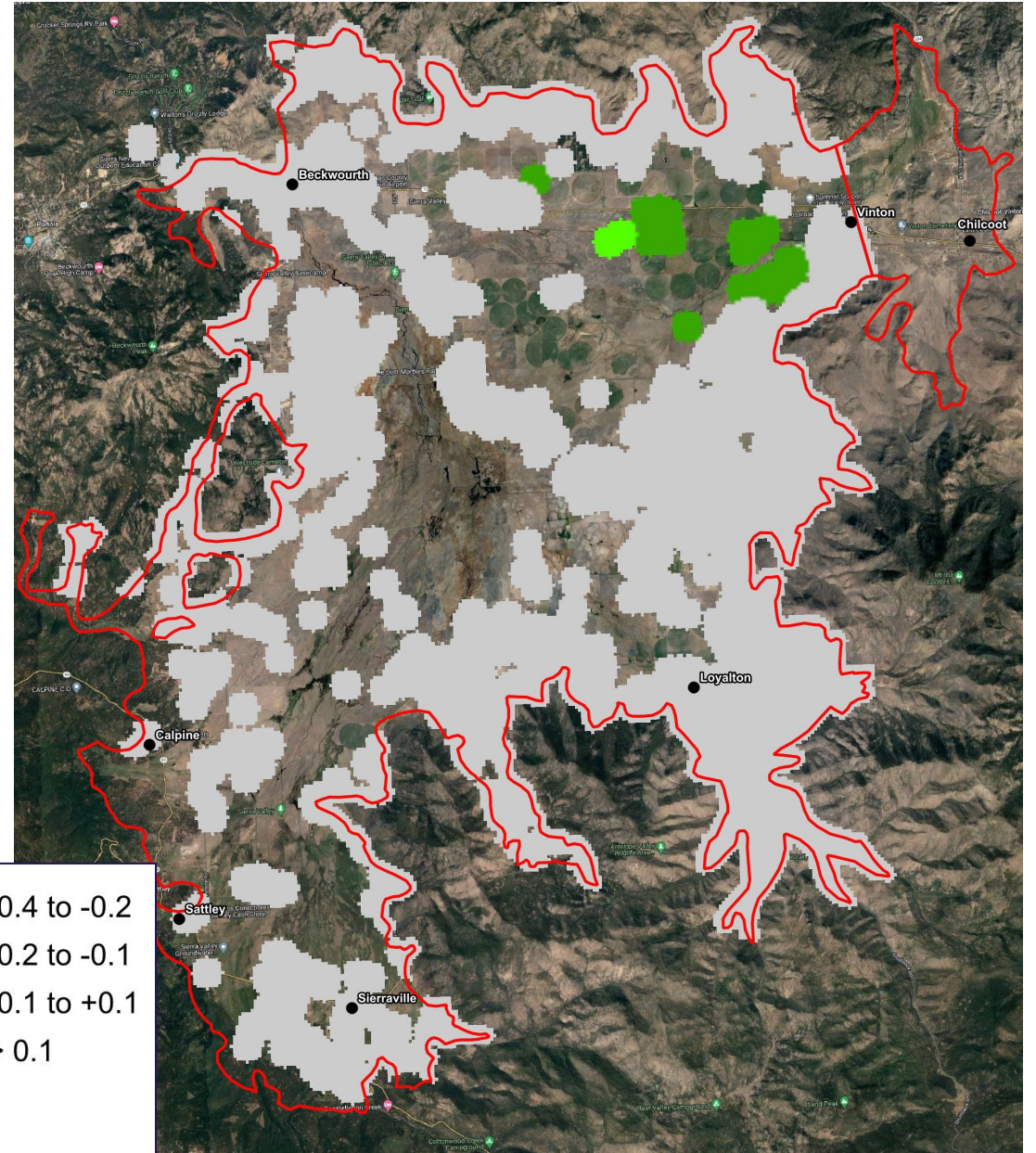
October: 2020 - 2021



October: 2021 - 2022



October: 2022 - 2023

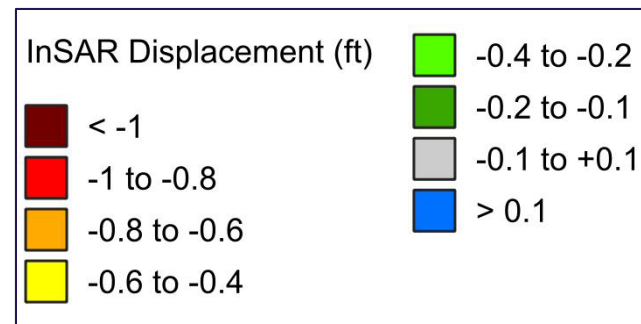
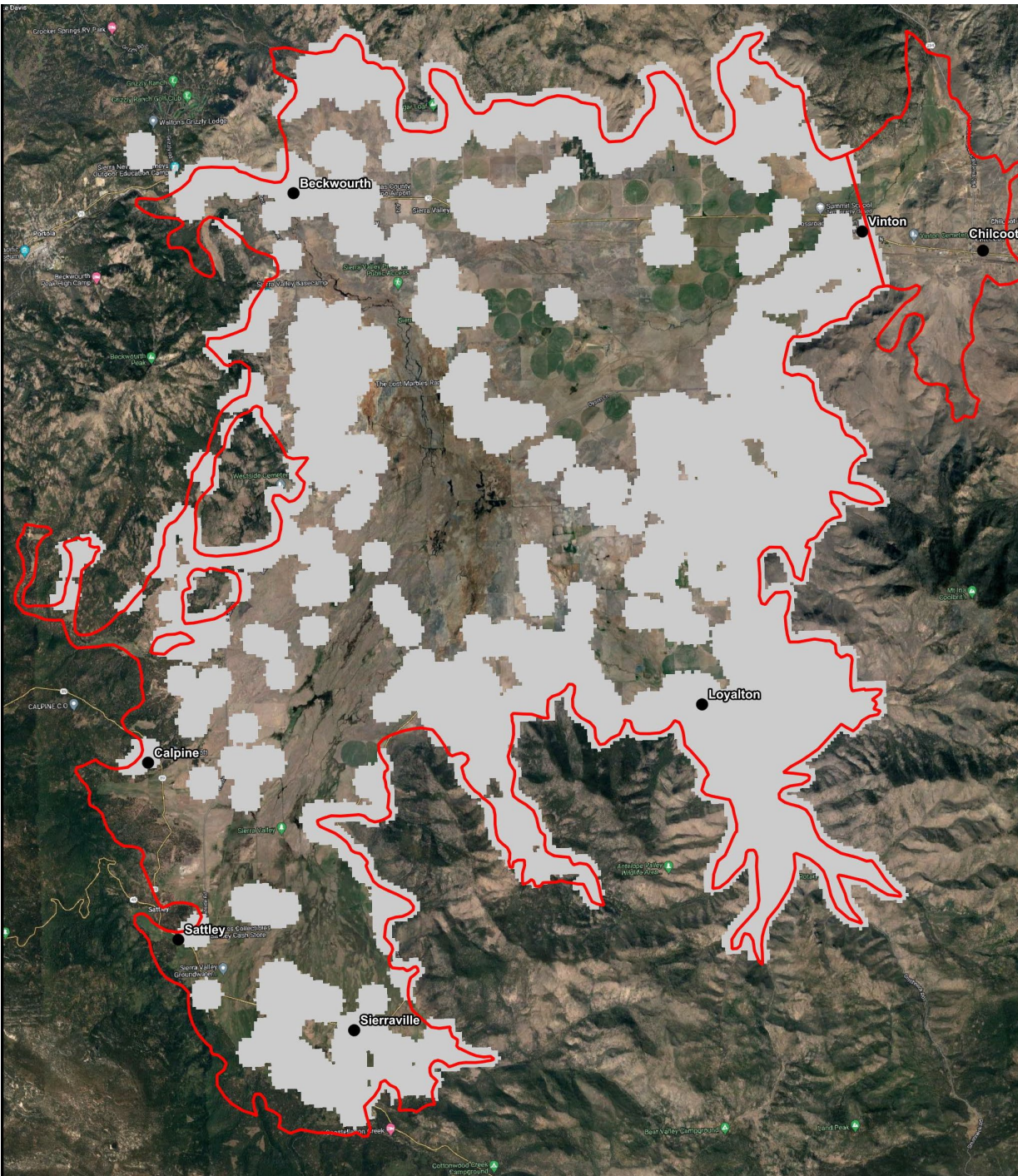




# April: 2023 - 2024 (Most recent data available)

No observed subsidence!

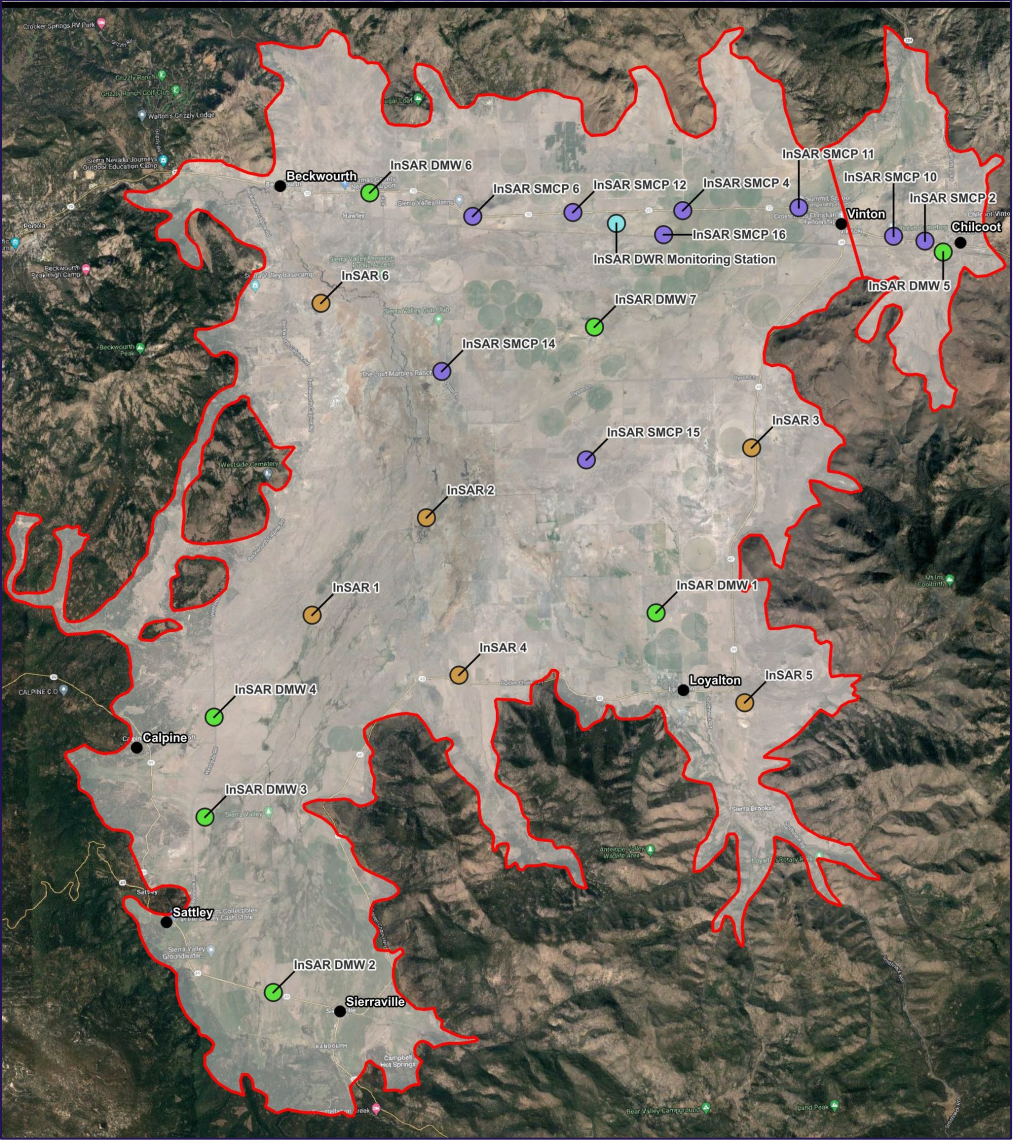
...but likely will continue if groundwater levels drop below most recent lows.



Points show where monthly InSAR measurements of land displacement are extracted to make timeseries plots.

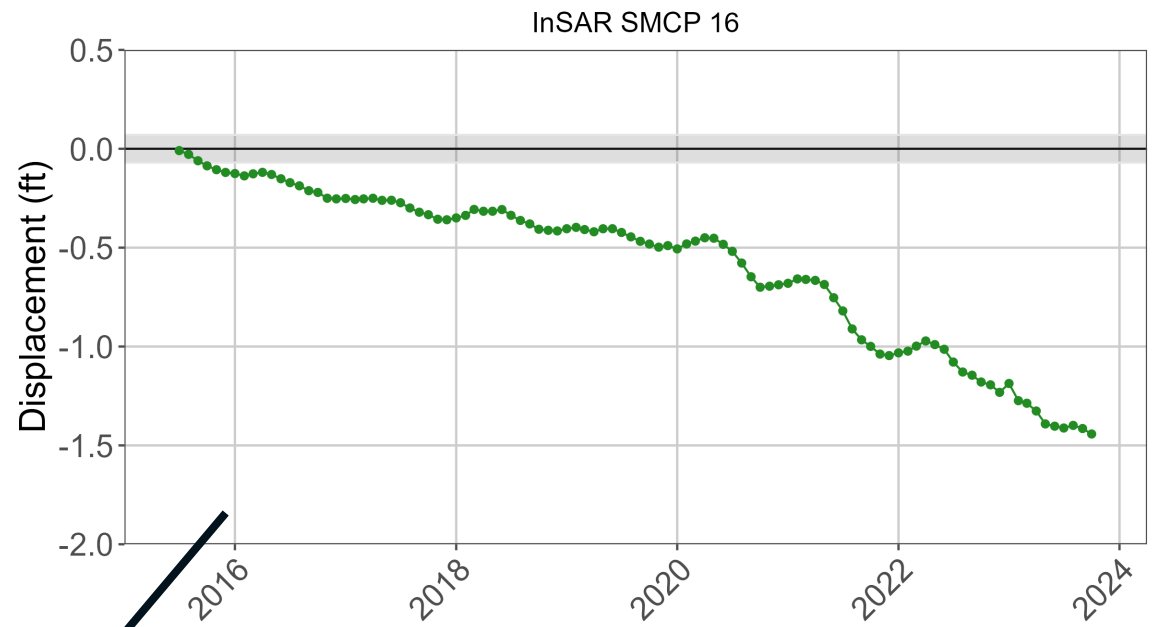
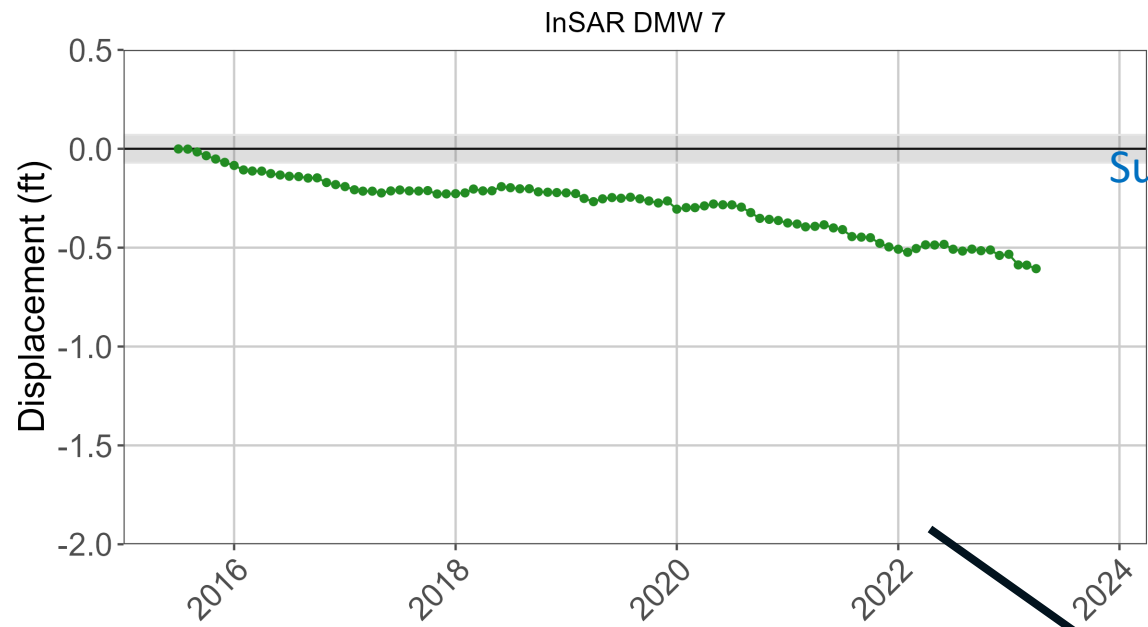
Points correspond with:

- Surveyed Monitoring Control Point (Monuments)
- District Monitoring Wells (DMWs)
- DWR Monitoring Station (will be moved)
- Areas with no other data (fill-in points)



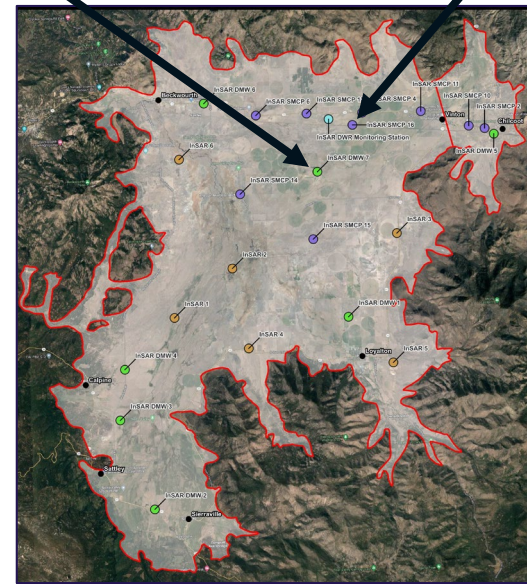
InSAR Monitoring Points

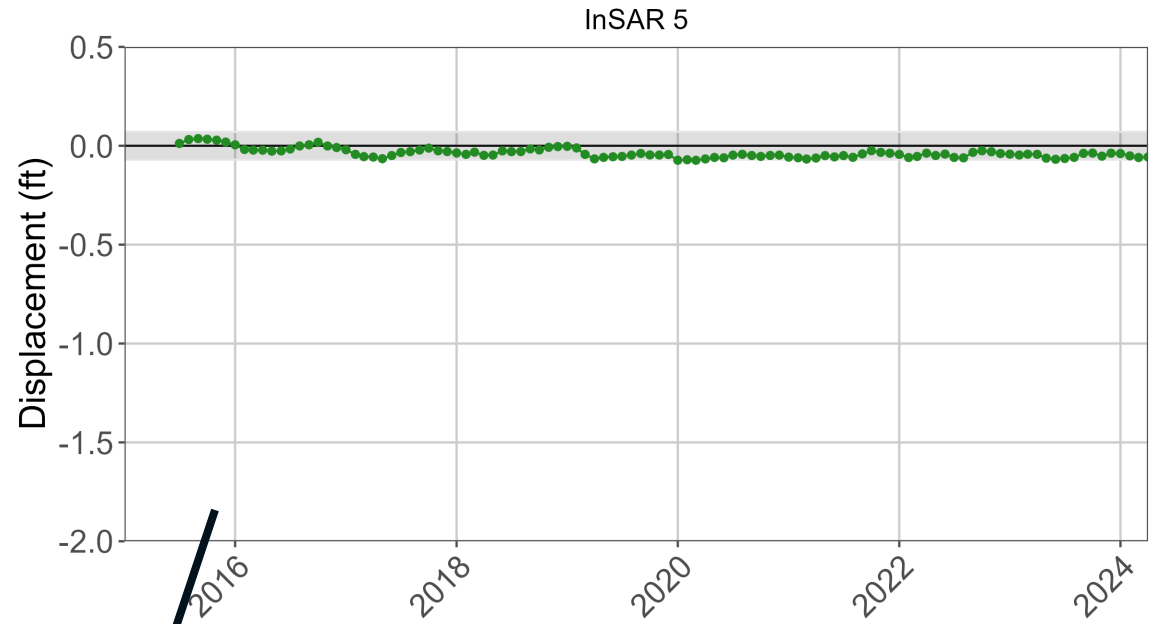
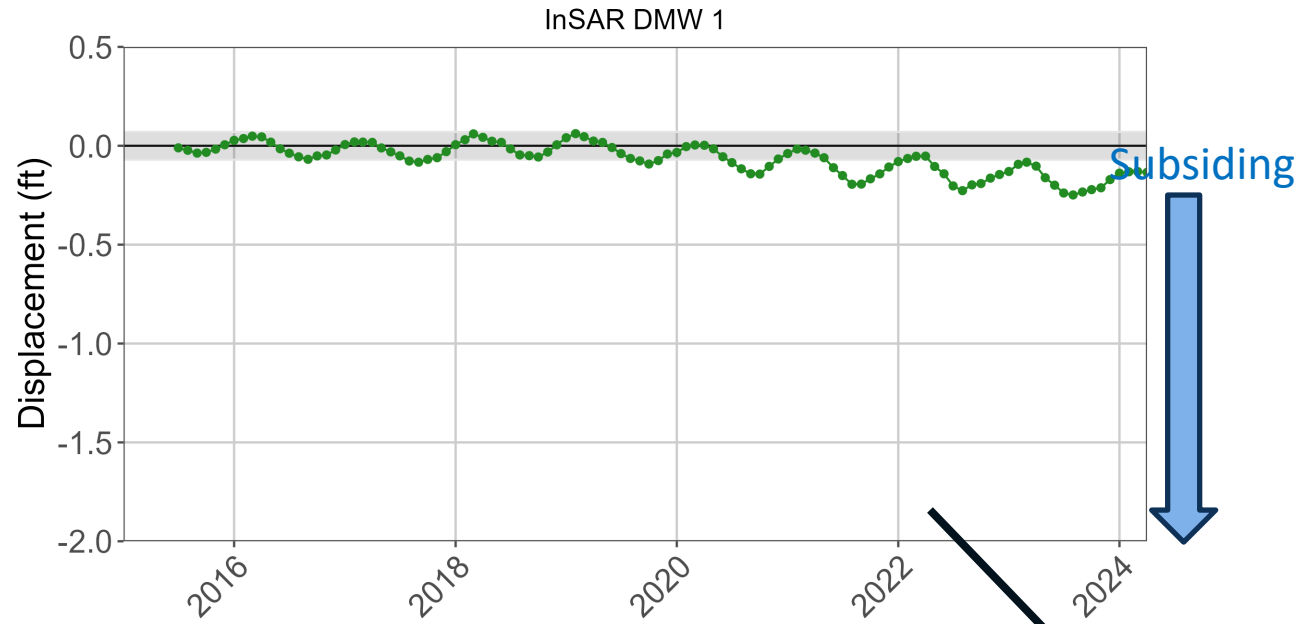
- District Monitoring Well
- DWR Monitoring Station
- InSAR Only
- Surveyed Monitoring Control Point



—●— Total Cumulative Displacement

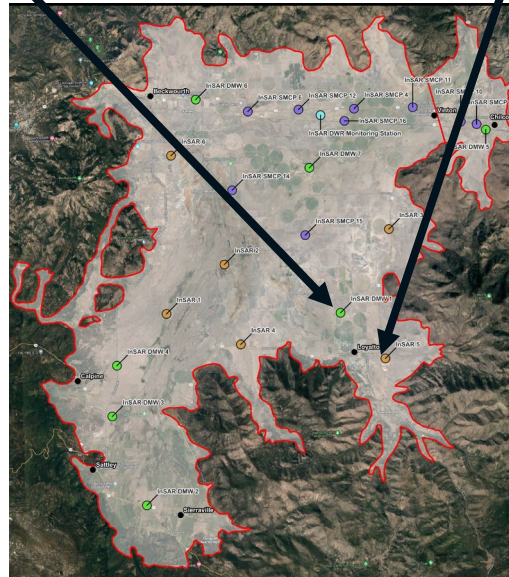
—●— Total Cumulative Displacement

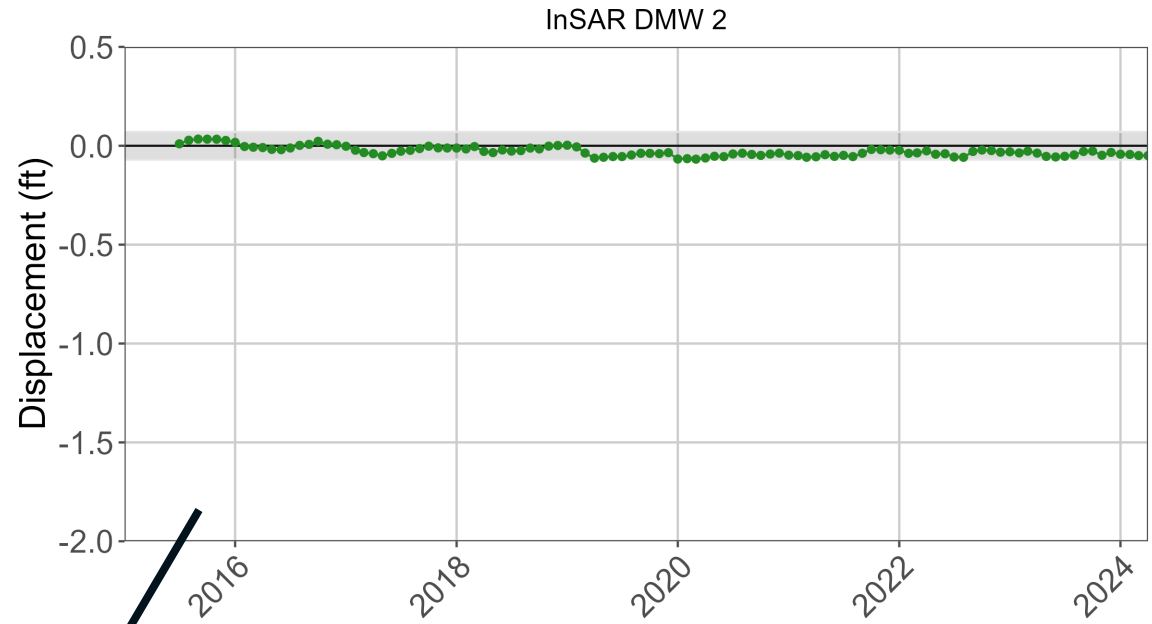
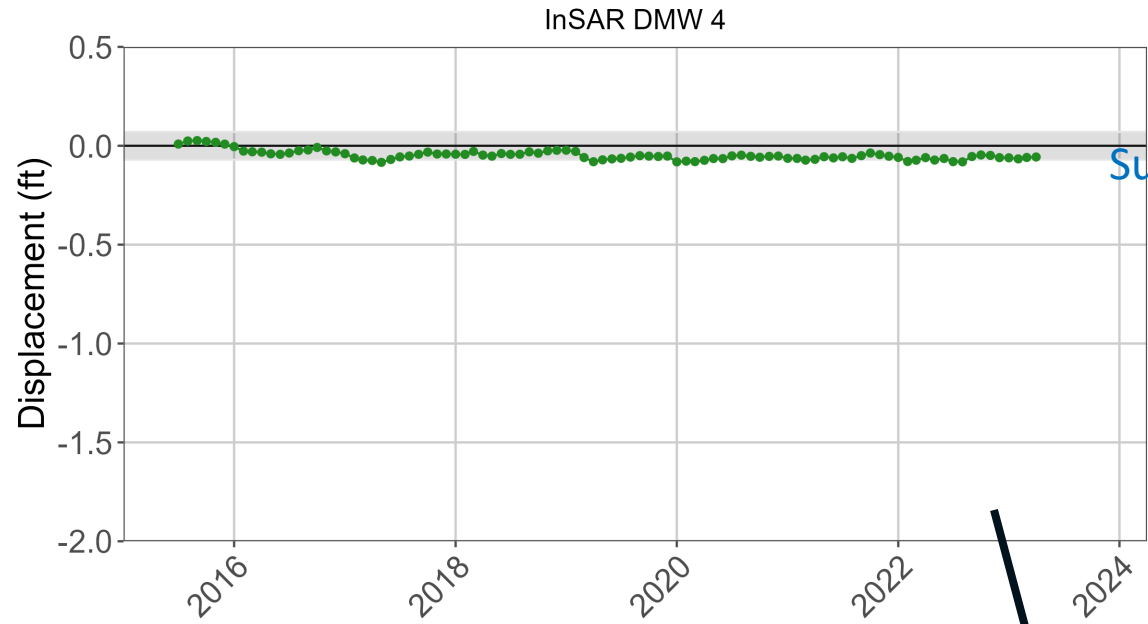




— Total Cumulative Displacement

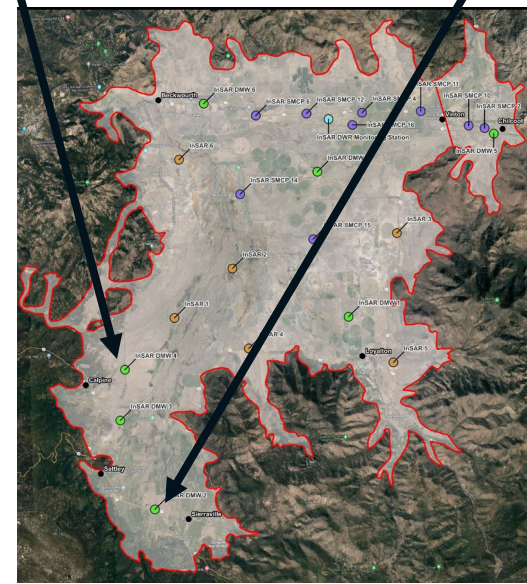
— Total Cumulative Displacement





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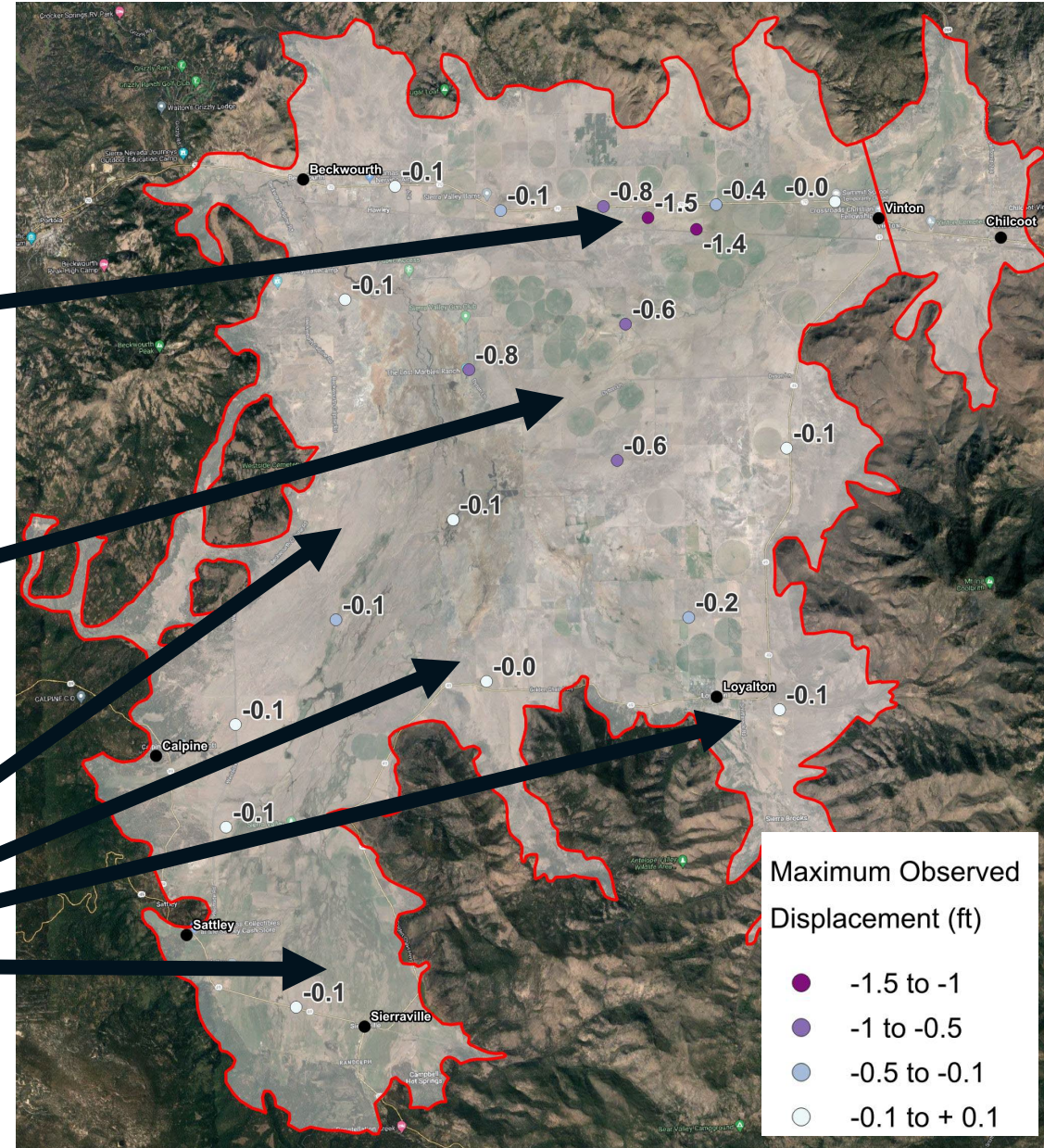


# Summary

Maximum observed subsidence of -1.5 ft

Observed subsidence decreases to the south and west

Negligible subsidence for a large portion of the basin



Maximum Observed Displacement (ft)

- 1.5 to -1
- 1 to -0.5
- 0.5 to -0.1
- 0.1 to +0.1



# Sierra Valley Groundwater Management District

